A radiating fin structure and a heat sink thereof. The radiating fin structure includes a main body. At least one input section and at least one output section extend from two ends of the main body respectively. The input section and the main body contain a first angle. The output section and the main body contain a second angle. The heat sink is composed of multiple radiating fins, at least one heat pipe and at least one chassis. The heat pipe penetrates through and strings the radiating fins to form one or more radiating fin assemblies. The input sections of the radiating fins of one radiating fin assembly are adjacent to the output sections of the radiating fins of another radiating fin assembly to together define a central heat dissipation section and multiple spiral heat dissipation flow ways as multiple flow guide structures to achieve better heat dissipation effect.
FIELD OF THE INVENTION

[0001] The present invention relates to a radiating fin structure and a heat sink thereof, and more particularly to a heat sink composed of multiple radiating fins with multiple flow guide structures for speeding convection of airflow so as to achieve better heat dissipation effect.

BACKGROUND OF THE INVENTION

[0002] Following the advance of semiconductor technology, the volumes of integrated circuits have become smaller and smaller. For processing more data, the number of components contained in a current integrated circuit is several times the number of components contained in a conventional integrated circuit with the same volume. The greater the number of the components contained in the integrated circuit is, the higher the heat generated by the integrated circuit in working is. As exemplified with a common central processor, under full-load condition, the heat generated by the central processor is high enough to burn out the entire central processor. Therefore, it has become a very important topic how to provide effective heat radiating measure for the integrated circuit.

[0003] In general, a heat sink is made of a metal material with high thermal conductivity. The heat sink has multiple plane radiating fins for increasing heat dissipation area. In order to promote heat dissipation effect, a fan is co-used with the heat sink to carry away the heat by way of forced convection. Moreover, heat pipes are added to the heat sink to speed heat dissipation and protect the integrated circuit from burning out.

[0004] FIG. 1 is a perspective assembled view showing a conventional thermal module. The thermal module 1 includes a heat sink 11 with multiple radiating fins 111 and a fan 12 connected to upper side of the heat sink 11. The fan 12 vertically forcedly blows airflow to heat sink 11 for dissipating the heat. FIG. 2 is a perspective assembled view of another type of conventional thermal module. In this thermal module, due to limitation of the heat dissipation space or the direction of the heat dissipation flow ways 112 of the radiating fins 111 of the heat sink 11, the fan 12 is connected to a lateral side of the heat sink 11 to horizontally forcedly blow airflow to the heat sink 11 for dissipating the heat. The fans 12 of the above two conventional thermal modules 1 are not replaceable with each other. Therefore, it is necessary to re-design and manufacture the heat sink 11 or the fan 12 to adapt the fan 12 to the heat sink 11. In this case, not only the manufacturing cost is increased, but also it is inconvenient to use the thermal module 1. Furthermore, in the conventional thermal module 1, the fan 12 can only selectively blow heat dissipation fluid 13 to the heat sink 11 vertically or horizontally. Therefore, it is impossible for the conventional thermal module to multidirectionally dissipate the heat. According to the above, the conventional thermal module has the following shortcomings:

1. The manufacturing cost is higher.
2. The fan can be hardly commonly applied to the heat sink.
3. The heat dissipation efficiency is low.

SUMMARY OF THE INVENTION

[0005] A primary object of the present invention is to provide a radiating fin structure with excellent flow guiding effect.

[0006] A further object of the present invention is to provide a heat sink with excellent flow guiding effect.

[0007] A still further object of the present invention is to provide the above heat sink, which is able to dissipate heat in multiple directions.

[0008] A still further object of the present invention is to provide the above heat sink, which is manufactured at lower cost.

[0009] To achieve the above and other objects, the radiating fin structure of the present invention includes a main body. At least one input section and at least one output section extend from two ends of the main body respectively. The input section and the main body contain a first angle. The output section and the main body contain a second angle. The heat sink is composed of multiple radiating fins, at least one heat pipe and at least one chassis. The heat pipe has at least one heat dissipation end and at least one heat absorption end. The chassis has at least one groove in which the heat absorption end of the heat pipe is received. The heat dissipation end of the heat pipe penetrates through and string the radiating fins to form one or more radiating fin assemblies. The input sections of the radiating fins of one radiating fin assembly are adjacent to the output sections of the radiating fins of another radiating fin assembly to together define a central heat dissipation section and multiple spiral heat dissipation flow ways. The heat sink can dissipate heat by way of natural convection. Alternatively, the heat sink is housed in a jacket mated with a fan. The fan serves to vertically blow airflow to the heat sink to forcibly dissipate the heat from the heat sink or laterally blow the airflow to the heat sink to forcibly dissipate the heat from the heat sink. No matter whether the heat is dissipated from the heat sink by way of natural convection or forced convection, a very good heat dissipation effect is achieved. Moreover, the angles contained between the input section and the main body and the output section and the main body can be freely adjusted to enhance convection. Also, the heat sink is manufactured with less material at lower cost. Furthermore, the heat sink can be more easily manufactured and more quickly assembled. In addition, the fan is easily replaceable. According to the aforesaid, the heat sink of the present invention has the following advantages:

[0010] 1. The heat sink is able to provide excellent heat dissipation effect.
[0011] 2. The manufacturing labor is reduced and the manufacturing time is shortened.
[0012] 3. The manufacturing cost is lower.
[0013] 4. The fan is more easily replaceable.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein:

[0015] FIG. 1 is a perspective view of a conventional thermal module;
FIG. 2 is a perspective view of another type of conventional thermal module;

FIG. 3 is a perspective view of the radiating fin of the present invention;

FIG. 4 is a perspective exploded view of the heat sink of the present invention;

FIG. 5 is a perspective assembled view of the heat sink of the present invention;

FIG. 6 is a front view of the heat sink of the present invention;

FIG. 7 is a perspective exploded view of the thermal module of the present invention;

FIG. 8 is a perspective assembled view of the thermal module of the present invention;

FIG. 9 is a perspective assembled view of another embodiment of the thermal module of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Please refer to FIG. 3, which is a perspective view of the radiating fin of the present invention. The radiating fin 2 includes a main body 21. At least one input section 22 and at least one output section 23 oppositely extend from two ends of the main body 21 respectively. To speak more specifically, the input section 22 upward extends from one side of the main body 21, while the output section 23 downward extends from the other side of the main body 21. The input section 22 and the main body 21 contains a first angle 24 on one side of the main body 21, while the output section 23 and the main body 21 contains a second angle 25 on an opposite side of the main body 21. The first angle 24 is greater than 0 degrees and less than 180 degrees. The second angle 25 is greater than 0 degree and less than 180 degrees. In addition, the radiating fin 2 has at least one perforation 26, which can be selectively formed on the main body 21, the input section 22 or the output section 23. In this embodiment, the perforation 26 is formed on the main body 21 (as shown in FIG. 3).

Please now refer to FIGS. 4, 5 and 6. The radiating fins 2 are assembled with at least one heat pipe 3 and at least one chassis 4 to form a heat sink 5. The heat pipe 3 has at least one heat dissipation end 31 and at least one heat absorption end 32. The chassis 4 has at least one groove 41. In this embodiment, there are a first heat pipe 33, a second heat pipe 34 and a third heat pipe 35. The chassis 4 has a first groove 411, a second groove 412 and a third groove 413. The first, second and third heat pipes 33, 34, 35 are U-shaped. The first heat pipe 33 has a first heat dissipation end 331 and a second heat dissipation end 332 and a first heat absorption end 333. The second heat pipe 34 has a third heat dissipation end 341 and a fourth heat dissipation end 342 and a second absorption end 343. The third heat pipe 35 has a fifth heat dissipation end 351 and a sixth heat dissipation end 352 and a third heat absorption end 353. The first, second and third heat absorption ends 333, 343, 353 of the first, second and third heat pipes 33, 34, 35 are respectively received in the first, second and third grooves 411, 412, 413 of the chassis 4. The first, second, third, fourth, fifth and sixth heat dissipation ends 331, 332, 341, 342, 351, 352 of the first, second and third heat pipes 33, 34, 35 respectively penetrate through and string several sets of radiating fins 2 to form several radiating fin assemblies 2A (as shown in FIG. 6). The input sections 22 of the radiating fins 2 of one radiating fin assembly 2A are adjacent to the output sections 23 of the radiating fins 2 of another radiating fin assembly 2A to together define a central heat dissipation section 51 and multiple spiral heat dissipation flow ways 52. The spiral heat dissipation flow ways 52 are positioned around the heat sink 5 in communication with the central heat dissipation section 51. Also, the central heat dissipation section 51 communicates with the chassis 4.

Please now refer to FIG. 6, which is a front view of the heat sink of the present invention. The spiral heat dissipation flow ways 52 around the heat sink 5 permit natural convection of the heat dissipation airflow 6 around the heat sink 5. When the heat dissipation airflow 6 enters the central heat dissipation section 51 and the spiral heat dissipation flow ways 52, the central heat dissipation section 51 and the spiral heat dissipation flow ways 52 guide the heat dissipation airflow 6 to speed convection thereof. Therefore, no matter whether the heat dissipation airflow 6 enters the central heat dissipation section 51 and the spiral heat dissipation flow ways 52 vertically or laterally, the heat dissipation airflow 6 can dissipate the heat from the heat sink 5 by way of convection.

Please refer to FIGS. 7, 8 and 9. The heat sink 5 is housed in a jacket 7 mated with a fan 8 to form a thermal module 9. The jacket 7 has a first open end 71 and a second open end 72. The fan 8 can be selectively connected to any of the first and second open ends 71, 72. In this embodiment, the fan 8 serves to vertically forcibly dissipate the heat from the heat sink 5. Alternatively, as shown in FIG. 9, a mount 7A is horizontally connected to one side of the heat sink 5 and assembled with a fan 8 to form a thermal module 9. One end of the mount 7A is engaged with the heat sink 5, while the other end of the mount 7A is mated with the fan 8. Accordingly, the fan 8 can laterally blow the heat dissipation airflow 6 to the heat sink 5 to forcibly dissipate the heat therefrom.

The present invention has been described with some preferred embodiments thereof and it is understood that many changes and modifications in the described embodiments can be carried out without departing from the scope and the spirit of the invention that is intended to be limited only by the appended claims.

What is claimed is:

1. A radiating fin structure comprising a main body, at least one input section and at least one output section extending from two ends of the main body respectively, the input section and the main body containing a first angle, the output section and the main body containing a second angle.

2. The radiating fin structure as claimed in claim 1, wherein the radiating fin structure has at least one perforation, the perforation being selectively formed on the main body, the input section or the output section.

3. The radiating fin structure as claimed in claim 1, wherein the input section upward extends from the main body.

4. The radiating fin structure as claimed in claim 1, wherein the output section downward extends from the main body.

5. The radiating fin structure as claimed in claim 1, wherein the first angle is greater than 0 degree and less than 180 degrees.

6. The radiating fin structure as claimed in claim 1, wherein the second angle is greater than 0 degree and less than 180 degrees.

7. The radiating fin structure as claimed in claim 1, wherein the first angle and the second angle are positioned on opposite sides of the main body.

8. A heat sink comprising:
at least one heat pipe having at least one heat dissipation end and at least one heat absorption end;
one or more radiating fin assemblies each including multiple radiating fins, each of the radiating fins having a main body, at least one input section and at least one output section extending from two ends of the main body respectively, the input section and the main body containing a first angle, the output section and the main body containing a second angle, the heat dissipation end of the heat pipe penetrating through and stringing the radiating fins to form the radiating fin assembly, the input sections of the radiating fins of one radiating fin assembly being adjacent to the output sections of the radiating fins of another radiating fin assembly to together define a central heat dissipation section and multiple spiral heat dissipation flow ways; and a chassis having at least one groove in which the heat absorption end of the heat pipe is received.

9. The heat sink as claimed in claim 8, wherein the central heat dissipation section communicates with the spiral heat dissipation flow ways.

10. The heat sink as claimed in claim 8, wherein the central heat dissipation section communicates with the chassis.

11. The heat sink as claimed in claim 8, wherein the heat sink is housed in a jacket having a first open end and a second open end.

12. The heat sink as claimed in claim 11, wherein the jacket is assembled with at least one fan, the fan being selectively connected to any of the first and second open ends of the jacket.

13. The heat sink as claimed in claim 8, wherein the spiral heat dissipation flow ways are positioned around the heat sink.

14. The heat sink as claimed in claim 8, wherein a mount is horizontally connected to one side of the heat sink, one end of the mount being mated with at least one fan.

15. The heat sink as claimed in claim 8, wherein each of the radiating fins has at least one perforation, the perforation being selectively formed on the main body, the input section or the output section.

16. The heat sink as claimed in claim 8, wherein the input section upward extends from the main body.

17. The heat sink as claimed in claim 8, wherein the output section downward extends from the main body.

18. The heat sink as claimed in claim 8, wherein the first angle is greater than 0 degree and less than 180 degrees.

19. The heat sink as claimed in claim 8, wherein the second angle is greater than 0 degree and less than 180 degrees.

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